SDSS-II: Outreach and Broader Impact

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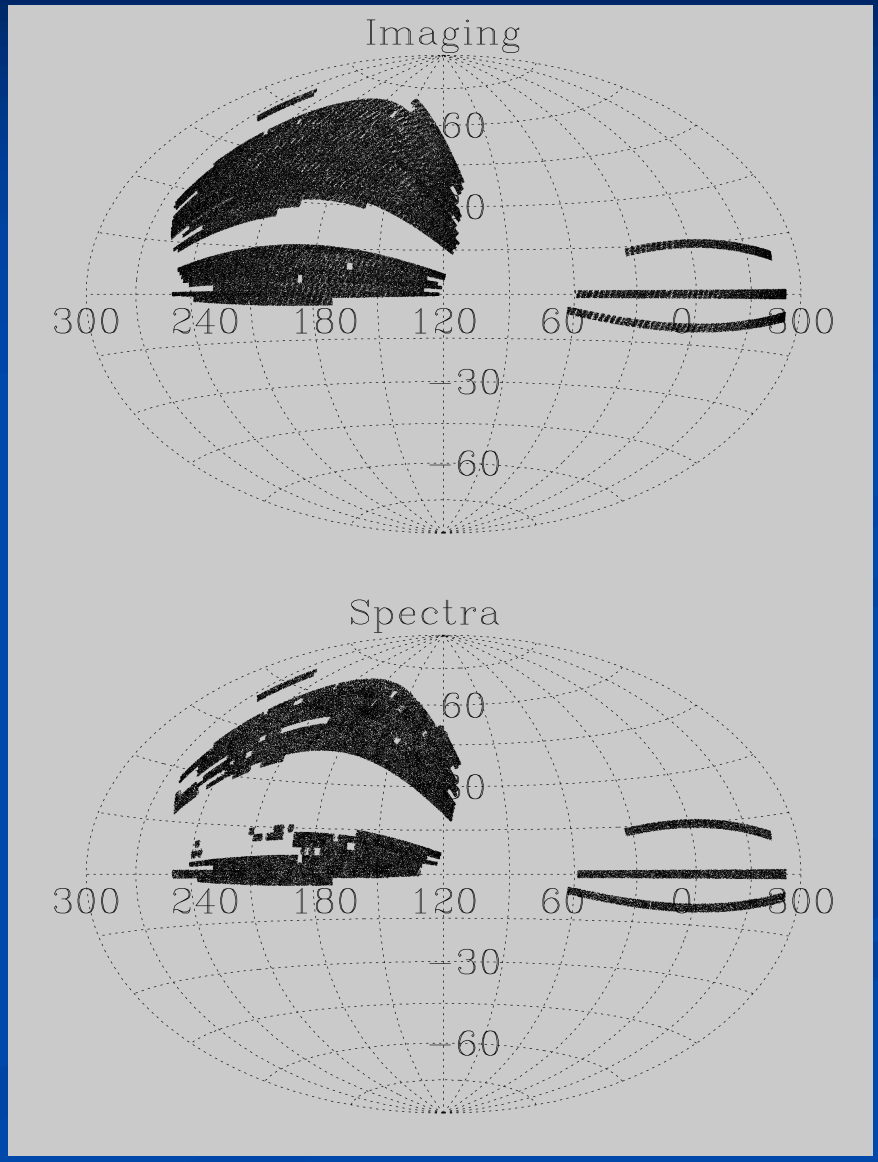
- SDSS' impact on the astronomical community
- SDSS' impact on the general public
- Involving external people in SDSS collaboration
- Ease of use of SDSS databases

SDSS and the Astronomical Community

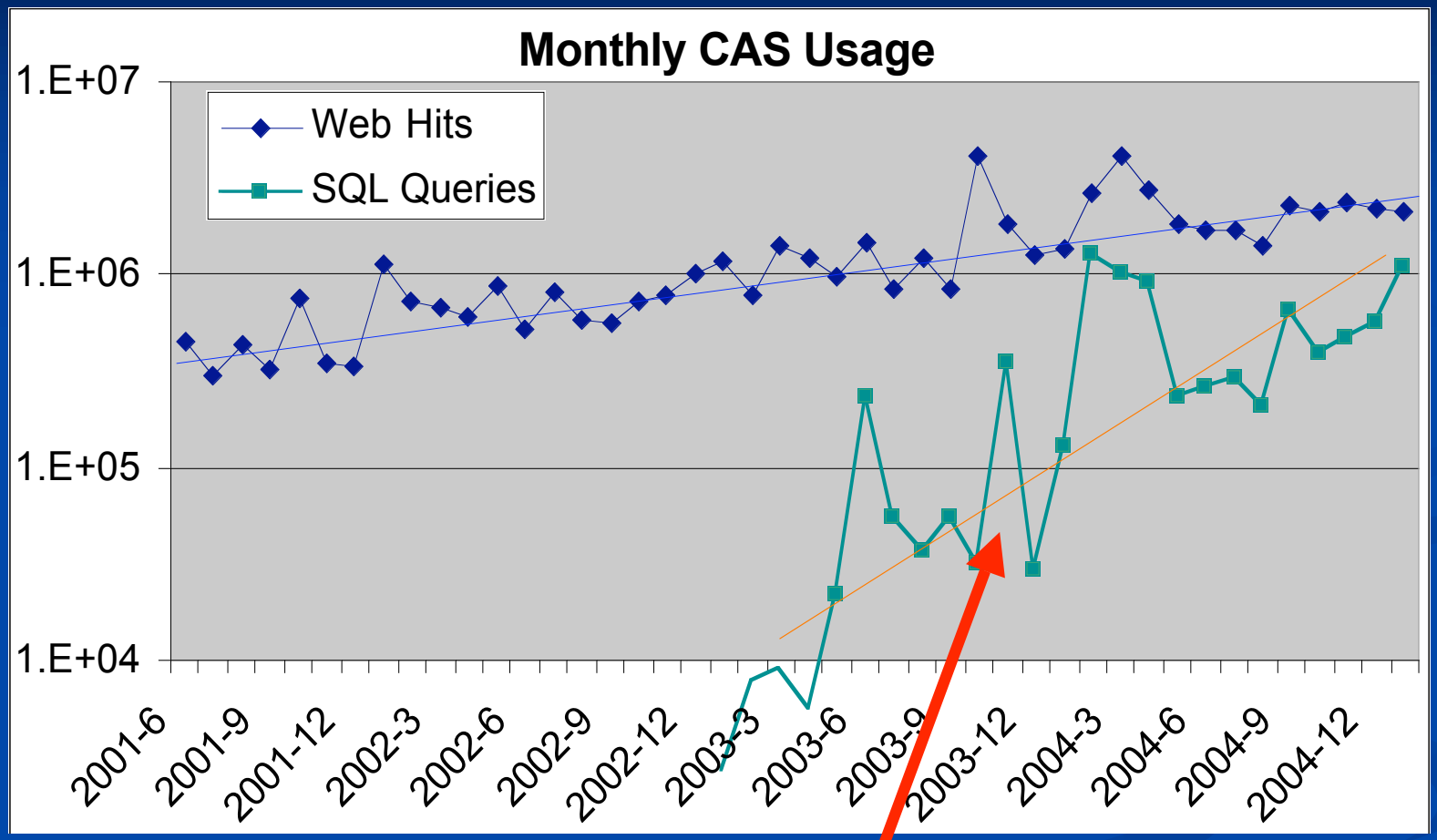
- SDSS data have been distributed to the community in a series of public data releases, roughly one per year.
- The most recent (DR3, in September 2004) contains 528,640 spectra and detailed photometry for 141 million objects over 5282 square degrees.

Sky coverage of DR4, to be released in June (on schedule)

We will continue releasing all survey-quality data through the end of SDSS-II (through DR8!).

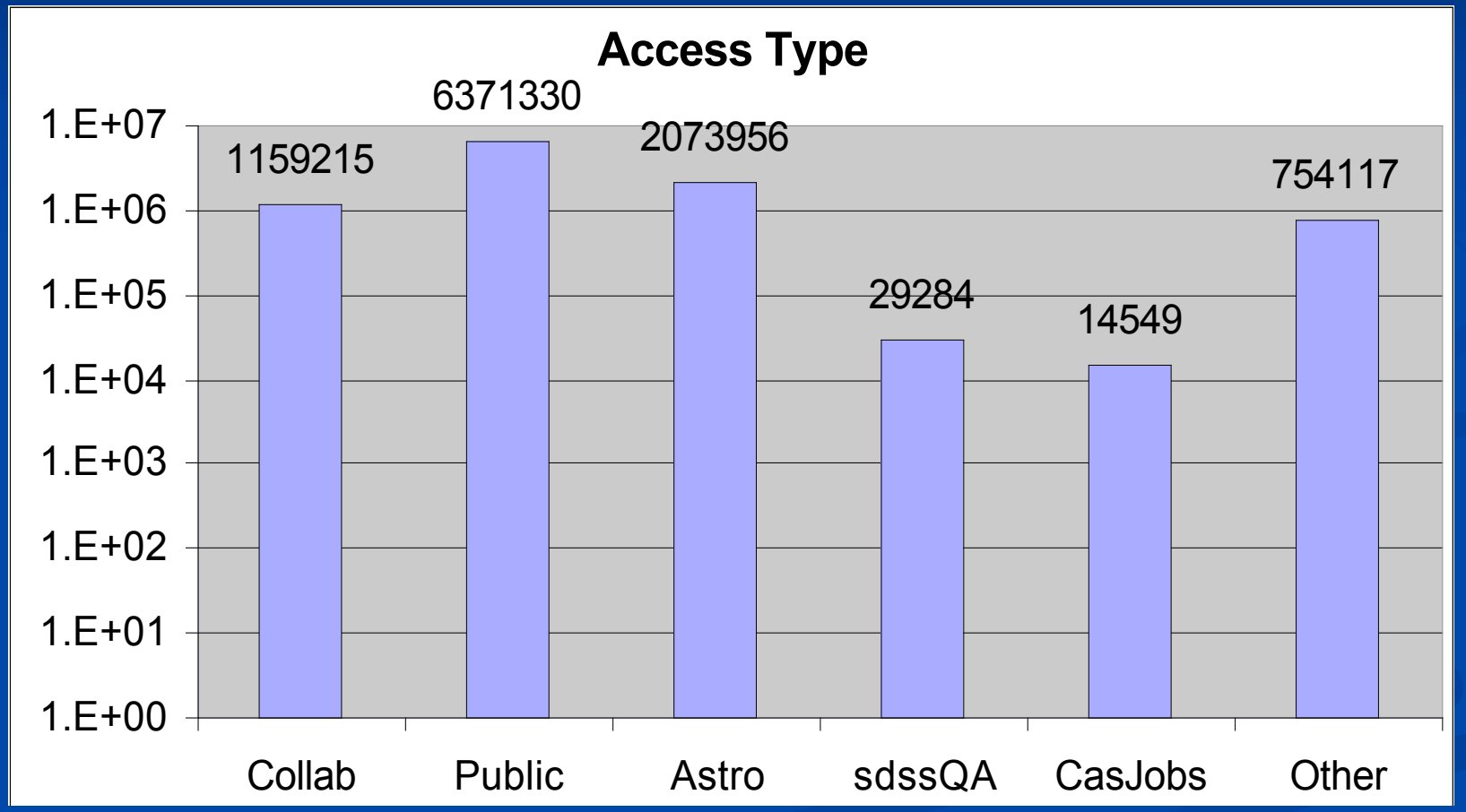


Usage of the Catalog Archive Server with time

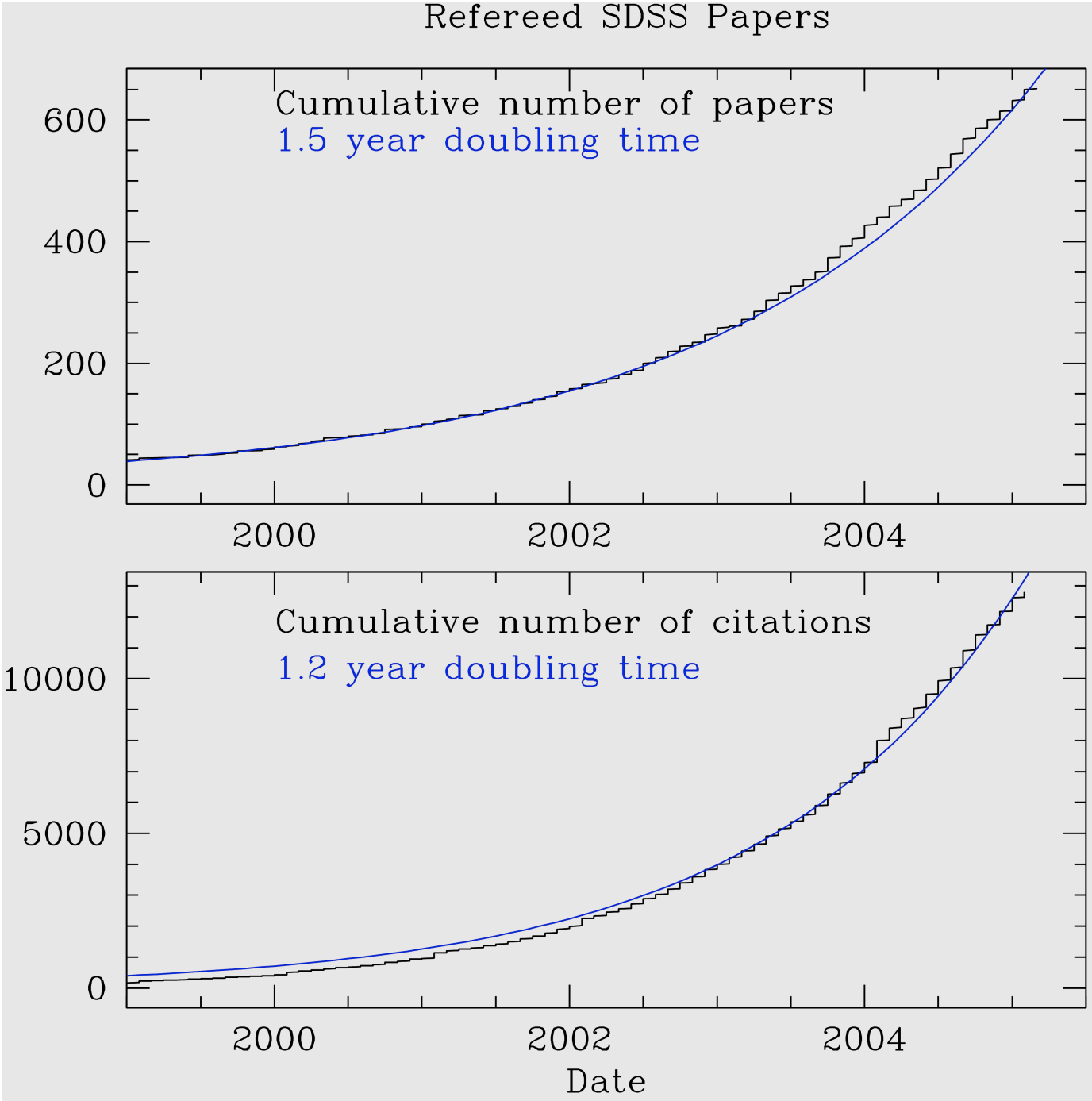


SQL (sophisticated queries) usage increasing rapidly!

Number of web hits from various sources

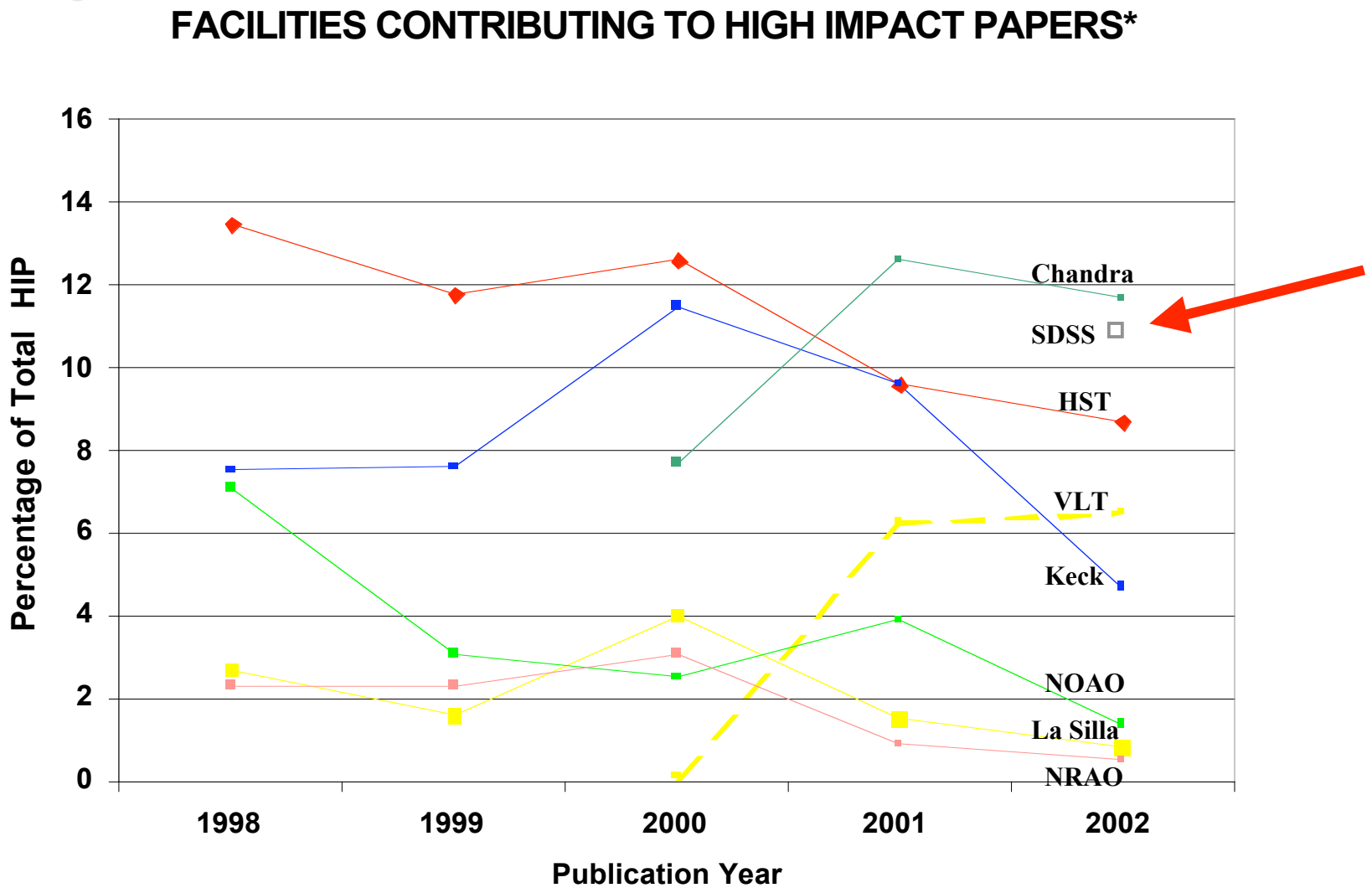


- There have been 660 refereed papers published to date that mention SDSS in the title or abstract.
- The most recent AAS meeting alone included 85 abstracts based on SDSS.
- SDSS papers received 40 citations per 2001 paper, more than any other facility on the ground or in space (Trimble et al.). Keck was second, with 21 citations per paper.
- In the last year, over half of the 213 SDSS papers published were by astronomers outside the collaboration.



(Based on an ADS query for papers that mention SDSS in abstract or title).

Citation impact of SDSS papers in 2002 is comparable to that of Chandra; higher than HST, Keck.



Courtesy of Bob Williams, STScI

**Most cited 200 papers*

SDSS and other telescopes

- SDSS is the default optical comparison dataset for GALEX, Spitzer: 8/30 GALEX ApJL special issue papers make use of SDSS data.
- SDSS filter set is used by ACS on Hubble, Gemini, etc. Existence of SDSS calibrated photometry gives a dense grid to calibrate images taken on any of the larger telescopes. (e.g., used by Tonry et al. 2003 to calibrate high-z SN photometry on Keck, VLT, HST, etc.)
- SDSS-II, with larger sky coverage and improved calibration, will strengthen this advantage.

- SDSS data is forming the basis of major programs being carried out on MMT (Hectospec), AAT (85 nights!), UKIRT and Spitzer (brown dwarfs), HST (118 orbits for damped Ly alpha lines), etc.
- SDSS is the standard optical dataset for reference to existing and planned wide-field surveys in other bands, such as FIRST (20 cm) and UKIDSS (near-IR).
- SDSS software being used for major surveys such as DEIMOS/DEEP on Keck.

``Imitation is the sincerest form of flattery"

- SDSS is being used as a model for the next generation of sky surveys: filter choices, software decisions, data distribution, science drivers, collaboration design, etc:
  - Pan-STARRS
  - LSST
  - Dark Energy Survey
  - SALT Drift-Scan Survey
- SDSS data are NVO-compliant, and are among the first substantial data set included in the NVO itself. Helped tremendously by SDSS' superb astrometry.

SDSS and Students

- There were 20 PhD. theses based on SDSS data completed within the collaboration in the last year. Another 44 theses in progress. From 16 US institutions, and 8 overseas.
- 55 further graduate students, and 51 undergraduates are carrying out SDSS research.
- SDSS students and postdocs have gone on to some of the top jobs in the country (6 Hubble and Spitzer Fellows; faculty positions at Santa Cruz, Arizona, Washington, LBL, Pennsylvania, Portsmouth, York, RPI, MIT, etc…)

Jim Gunn (SDSS Project Scientist) has won four major awards in the last few years, all of which cite the SDSS explicitly:

- R.M. Petrie Prize, 2001 (Canadian Astronomical Society)
- First Joseph Weber Prize for Instrumentation, 2002 (AAS)
- Henry Norris Russell Lectureship, 2005 (AAS)
- Crafoord Prize, 2005 (Royal Swedish Academy of Sciences)

SDSS and the Public

- There is a public version of the CAS (SkyServer) which is getting almost twice the hits from professionals.
- This public version includes extensive educational materials.
- SDSS results get frequent writeups in New York Times, Sky & Telescope, Science News, etc. The general public is familiar with the survey.

- The American Museum of Natural History is joining SDSS-II. It plans to incorporate SDSS and SDSS-II data into all aspects of its programs:
  - Astrobulletin (cross-media packages distributed nationwide)
  - Digital map of the Milky Way.
  - Fly-throughs of SDSS data
  - Space Show for Hayden Planetarium and beyond.

- Griffith Observatory is planning a 152 ft by 20 ft display of the SDSS scan through Virgo (30 deg^2), filling up one wall of their renovated exhibit space. A million dollar investment!

(A tiny fraction of the scan)

Q. 7: Involvement of astronomers outside the SDSS Collaboration

- We have a program of *external collaborators*, who bring expertise, followup telescopic resources, to SDSS scientific projects. In 2004, we had 45 such collaborators approved. They were lead authors on ~15% of SDSS collaboration papers in 2004 (including most highly-cited paper of the year).
- Students and postdocs who leave SDSS institutions are allowed to complete SDSS projects and continue their science.
- A small number of external scientists are named *external participants*, and are given full data rights, for their contribution to SDSS infrastructure (e.g., Connie Rockosi from Santa Cruz!).

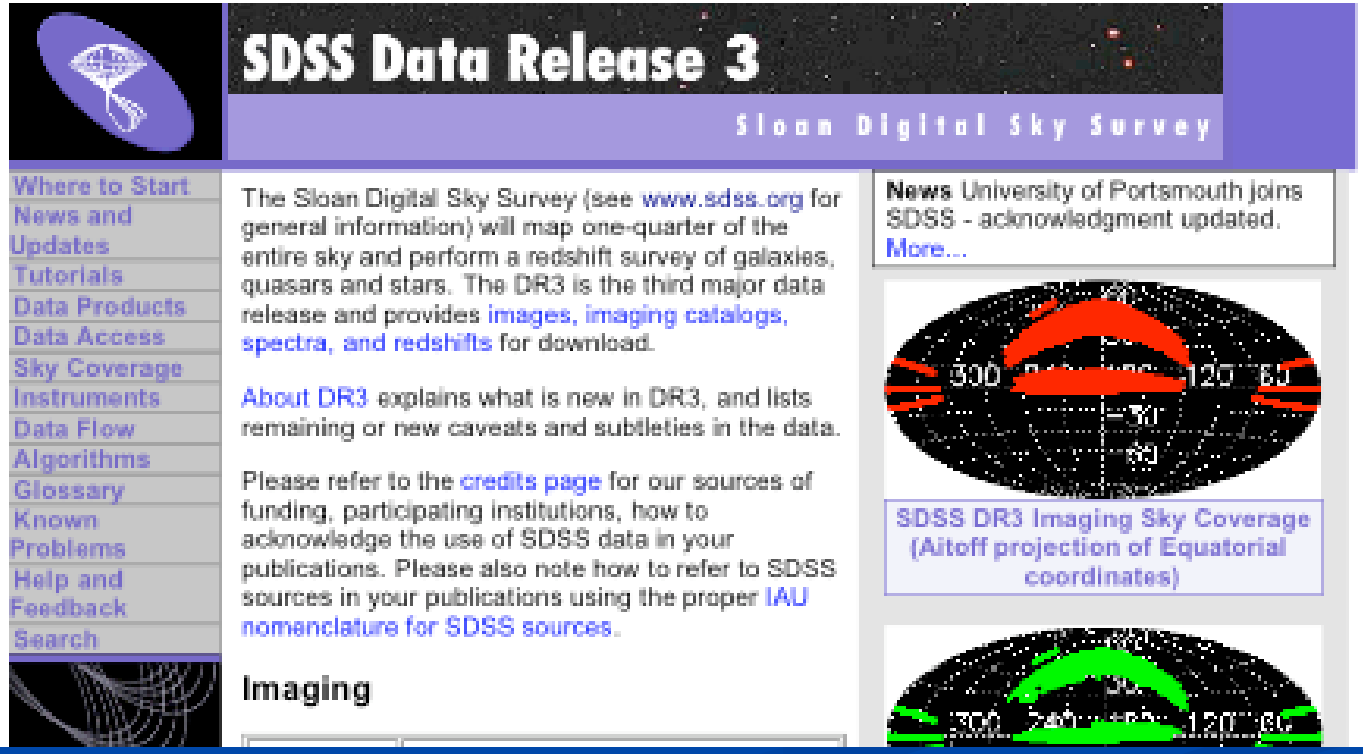
Q 8. Ease of use of database interface

The best way for new users to learn about, and get access to the data is via the public data release website:

http://www.sdss.org/dr3

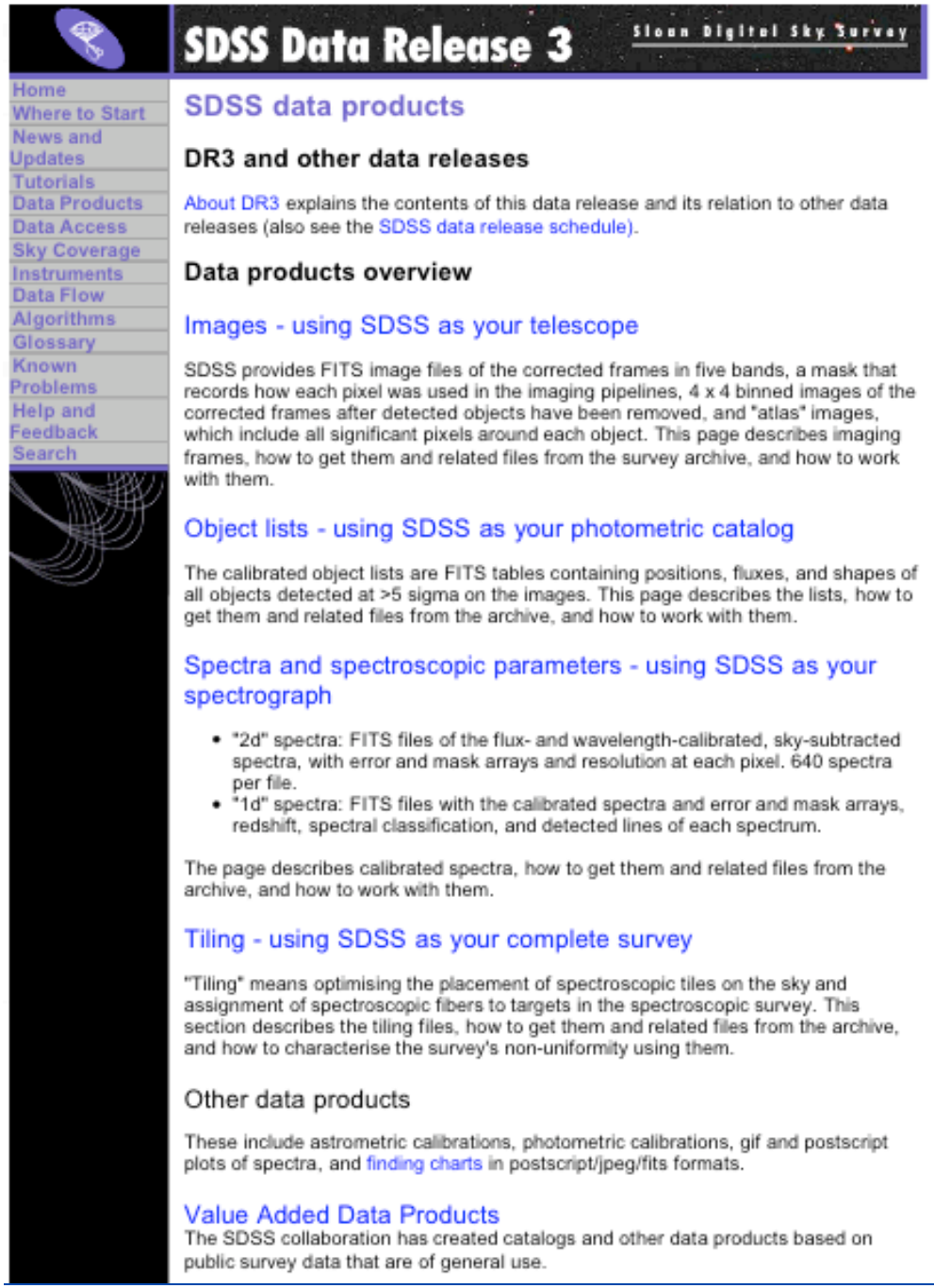
This includes detailed explication of the data themselves, and the many interfaces to it.

http://www.sdss.org/dr3



In particular, this includes links to:

- http://cas.sdss.org The Catalog Archive Server,
- for queries on object catalogs, etc.
- http://das.sdss.org for bulk downloads of flat files.
- GUI interfaces for downloading finding charts, individual spectra, etc.
- Value-added catalogs of galaxies, quasars, asteroids, clusters, imaging scans through Orion, etc.



http://www.sdss.org/dr3/products/index.html

Catalog Archive Server (CAS) Sear

Web interfaces

Catalog Archive Server (CAS)	The Catalog Archive Ser querying the imaging and
Spectro Query Server	**New**: now part of the CA spectral or photometric p
Imaging Query Server	**New**: now part of the CA position or by photometri
SpecList	Upload plate,MJD,fiber li
Imaging cross-ID	Find SDSS matches for a
SQL search	Directly search the datab (also see skyserver help
CasJobs	**New**: Use this batch job the database without rest sets with your collaborat
Navigate	Point and click on SDSS
Finding charts	Generate jpeg finding cha
Image lists	Get jpeg cutouts of SDS finding chart. Option to g

Query clients

In addition to using the web interfaces above, yo database server to perform your own SQL querie

sdssQA	Provides GUI to edit and submit SQ
sqlcl	python script to submit SQL queries
skyserver.el	Submit SQL queries from an emac

http://www.sdss.org/dr3/access/index.html

User-friendly entrances into the CAS and DAS

Data Archive Server (DAS)

The DAS contains

- **images of the night sky** ("corrected frames") in fits and jpeg format
- **calibrated object lists** with photometric parameters as fits binary tables
- **reduced spectra and spectral parameters** as fits binary tables and ps/gif plots

Files and directories within the DAS are designated by survey identifiers of the desired data: **run/rerun/camcol/field** for imaging; **plate/MJD/fiberID** for spectroscopy. The easiest way to obtain this designation is by one of the query forms provided. The DAS is described in detail on the DAS structure and contents page.

Search

FOOT DR3	Check whether coordinate is in DR3 for arbitrary (list of) RA,DECs; if so, retrieve run,rerun,camcol,field,rowc,colc

Retrieve

DAS retrieval form	Use query forms above to obtain survey designation of required data to be uploaded here. Small result sets will be returned as .tar or .zip archive; larger sets can be downloaded using rsync (see rsync help). The coverage page explains runs, reruns etc.
rsync server	Recommended way for mirroring the DR3 data archive in part or whole. The rsync URL is `rsync://dr3@rsync.sdss.org/DR3`. See the rsync help page.
http access to DAS	Use your web browser or other http clients like wget. Recommended options for `wget` to mirror entire directories: `--no-host-directories -l inf -r -np --continue`
Spectra in bulk	Get all spectroscopic data, or redshift lists by object type (galaxies, quasars, stars)

Last modified: Wed May 26 14:00:05 CDT 2004

Send your questions to sdss-helpdesk@fnal.gov

People are getting to the data!

- Over half of published SDSS papers in recent years are by people from outside the collaboration using the database: essentially no people are publishing wrong results from misunderstanding the data or database.